HEALTH CONSULTATION

WISCONSIN STEEL

CHICAGO, COOK COUNTY, ILLINOIS

CERCLIS NO. ILD000849737

May 2, 1995

Prepared by

Illinois Department of Public Health
Under Cooperative Agreement with the
Agency for Toxic Substances and Disease Registry

BACKGROUND AND STATEMENT OF ISSUE

The Agency for Toxic Substances and Disease Registry (ATSDR) and the United States Environmental Protection Agency (USEPA) have requested that the Illinois Department of Public Health (IDPH) review the historical and environmental data available for this site and determine if a public health threat exists. The Wisconsin Steel Works (hereafter Wisconsin Steel) is located in Cook County, in the Lake Calumet region of southeast Chicago, east of Torrence Avenue and between east 100th Street and east 112th Street (Attachment 1). Wisconsin Steel consists of approximately 176 acres. The site has been divided into six areas: the main office area, the slag storage area (Attachment 2), the steel finishing area, the blast furnace area, the steel production area, and the coke plant area (Attachment 3). [1]

The site was operated as a steel plant from 1875 to 1980. Operations at Wisconsin Steel included blast furnace operations to process iron ore into iron, oxygen furnaces and open hearth furnaces to refine iron into steel, steel casting and milling to shape steel, and coke production and associated by-product recovery.

In 1977, International Harvester Company sold Wisconsin Steel to EDC Holding Company, a subsidiary of Envirodyne Industries. In 1979 a branch of the United States Department of Commerce, the Economic Development Administration (EDA), and International Harvester guaranteed loans to EDC. EDC filed for bankruptcy in 1980, and EDA took control of Wisconsin Steel the next year. The site is presently owned by the "Wisconsin Steel Trust," which formed between Continental Illinois National Bank and Trust Company of Chicago, EDA, and International Harvester (now Navistar). [2]

All steel operations were shut down by EDA in January 1981. This shutdown apparently took place without a plan for the disposition of any hazardous or toxic substances on the premises. From 1982 to 1984, various components of Wisconsin Steel were sold. From 1984 to 1991, a contractor for EDA demolished above grade structures at the site with the exception of the former number 6 mill, a truck warehouse, a security building, and the former main office building. These demolition activities resulted in the identification, generation, and storage of hazardous wastes formerly generated by Wisconsin Steel. The United States Environmental Protection Agency (USEPA) has designated Wisconsin Steel as a Superfund Accelerated Clean-up Model (SACM) site. Site remediation, begun by the United States Army Corps of Engineers (USACE), is currently being handled by Navistar. [3]

The USACE conducted a Phase I investigation in 1992, which included multi-media sampling in the subdivided areas of the site. Also in 1992, the USACE completed a Rapid Response effort to remove any contaminants or conditions which posed imminent threats to health or the environment at the site. This effort included the fencing and berming of hazardous areas, the removal and disposal of hazardous liquids and sludges, and the stabilization of soils to retard leaching of contaminants. USACE also covered former

basement and sump areas to prevent the pooling of water in these areas. However, the site still contains a number of areas of contaminated soils, underground storage tanks, and former basements and sumps containing contaminated fluids. Some parcels of Wisconsin Steel have been scheduled for application for the Illinois Environmental Protection Agency's Pre-Notice Site Clean-up Program.

There are hundreds of residences within a 1-mile radius of Wisconsin Steel, located primarily to the east, west and northwest. In addition, there are a number of commercial facilities to the north of the site along Torrence Avenue. Hauling operations are on-going at the site so access to the grounds can be gained. A chain link fence lines the northwest area of the site, however the fence is in disrepair and would not act as a barrier to anyone seeking access.

DISCUSSION

Soils, surface water, and groundwater at Wisconsin Steel have been impacted by past operations at the facility. Hazardous substances present at the site include heavy metals, cyanide, polynuclear aromatic hydrocarbons (PAHs), polychlorinated biphenyls (PCBs), pesticides, phenol, benzene, ethylbenzene, xylene, toluene, and other volatile organic compounds. The Phase I investigation conducted by the USACE in 1992 consisted of the installation of groundwater monitoring wells, the drilling and sampling of soil borings, the collection and analysis of surface water samples, and the collection and analysis of sediment samples. This sampling indicated that there is a wide range of contamination in the various areas of Wisconsin Steel. [4]

Table One (Attachment 4) lists the major contaminants found during the Phase I investigation. The maximum concentration of each contaminant found in each area was compared with comparison values for both carcinogenic and non-carcinogenic health endpoints. These comparison values were used to select contaminants for further evaluation. Comparison values for soil and sediments were based on adult (worker) exposures, while comparison values for water were based on child exposures via drinking contaminated water. The comparison values used included Environmental Media Evaluation Guides (EMEGs), Reference Dose Media Evaluation Guides (RMEGs), Cancer Risk Evaluation Guides (CREGs), and Maximum Contaminant Levels (MCLs). A detailed discussion of each of these comparison values is found in Attachment 5.

For each area of the site, the maximum concentration of each contaminant which exceeded comparison values is listed in the Tables (Attachments 6 - 10). Some contaminants were found in only one medium, while others were found in several. All of the areas demonstrated groundwater contamination. Surface water present in the steel finishing area, the steel production area, and the coke plant area was also contaminated. Contaminated sediments were found in all areas except the main office area. The degree of surface soil contamination varied greatly from area to area.

Exposure under either current or future use conditions could result from a number of routes:

1) direct contact with contaminated soils or sediments,
2) inhalation or ingestion of contaminated dust,
3) inhalation of chemicals that have volatilized from soils or sediments,
4) direct contact with contaminated surface water, and
5) ingestion of contaminated groundwater or surface water.

Potentially exposed populations include on-site workers, trespassers, and nearby residents.

Of particular concern are both carcinogenic and non-carcinogenic health effects possible due to exposure to PCBs and PAHs in contaminated sediments in the slag storage area; lead, PCBs, PAHs, and chlordane in contaminated soils and sediments in the steel finishing area; lead, PCBs, and PAHs in contaminated soils and sediments in the steel production area; lead and PCBs in contaminated soils and sediments in the blast furnace area; and lead and PAHs in contaminated soils and sediments in the coke plant area.

Possible health effects that may be related to exposure to contaminants of concern at levels found on the site are:

Chlordane--Swallowing small amounts of chlordane via contaminated soil can cause a variety of nervous system effects, including headaches, irritation, confusion, weakness, and vision problems, as well as upset stomach, vomiting, stomach cramps, diarrhea, and jaundice. Convulsions have occurred in humans who had long-term skin contact with soil containing large amounts of chlordane. [5]

Lead--Lead is especially dangerous to young children because of the deleterious effects it has on their central nervous system. In adults, lead exposure may decrease reaction time and possibly memory. Lead exposure may cause weakness in the ankles, wrists, or fingers; it may also increase blood pressure in middle-aged males and may be the cause of anemia. Some lead compounds have been determined to be carcinogens. [6]

PAHs--Individuals exposed to PAHs by inhalation or skin contact for long periods of time may develop cancer. Benz(a)anthracene, benzo(b)fluoranthene, benzo(j)fluoranthene, benzo(k)fluoranthene, benzo(a)pyrene, dibenzo(a,h)anthracene, and indeno(1,2,3-c,d)pyrene may be reasonably anticipated to be carcinogens. [7]

PCBs (Arochlors)--Little is known about the possible health effects in persons who are exposed to high levels of PCBs for a short period of time. Exposure to PCBs may cause skin irritations (such as acne and rashes), and irritation of the nose and lungs. PCBs may reasonably be anticipated to be carcinogens. [8]

Exposure to contaminated dusts and volatilized chemicals is possible for nearby residents, however this exposure is likely intermittent and minimal. Only surface soil data were considered for potential exposure. Because the site could be developed in the future with excavations and grading taking place, exposure to concentrations of chemicals in subsurface soils may need to be considered in the future.

Direct contact with contaminated surface water is possible for on-site workers and trespassers. After heavy rainfall, surface runoff can accumulate in low-lying areas. Dermal contact or ingestion of contaminated water could take place. Surface water contamination exists in the steel finishing, steel production, and coke plant areas. Besides the pooling of contaminated water, contaminated surface runoff is released to the Calumet River. However, the Calumet River is not used by area residents and industries as a source of drinking water and exposure through recreational use of the river would be insignificant.

Although groundwater is contaminated in all areas of the site, all area municipal and supply water is obtained from Lake Michigan, and supplied by the City of Chicago. Records indicate that there have been no operating wells in the area since 1984. Therefore, there is not presently a completed exposure pathway to contaminated groundwater.

CONCLUSIONS

Based on the information reviewed, IDPH concludes:

1. a potential health threat exists in association with the contaminants detected and the high potential for human contact with on-site contaminants;

2. on-site workers or trespassers could be exposed to hazardous substances via ingestion of, inhalation of, and dermal contact with soils, sediments, and surface water;

3. the potential for off-site human contact with on-site contaminants released into the air via volatilization or fugitive dust generation is probably minimal.

RECOMMENDATIONS

IDPH makes the following recommendations:

1. restrict public access to the site;
2. remediate highly contaminated areas of the site;
3. remove and backfill all sumps, pits, and areas where surface water can accumulate;
4. characterize and remove any remaining underground storage tanks;
5. prevent any human consumption of groundwater and surface water at the site;
6. performance of a full health assessment for this site when sufficient additional data are available.

K. D. Runkle, M.A.

REFERENCES

1. USEPA. Wisconsin Steel Works Site Environmental Remediation Fact Sheet #1. April 1992.

2. Dames and Moore. Closure Plan for Wisconsin Steel Works. April 1987.

3. U.S. Army Corps of Engineers. Wisconsin Steel Works: Site Characterization Interim Report. August 1993.

4. Ibid.

5. ATSDR. Toxicological Profile for Chlordane Draft. October 1992.

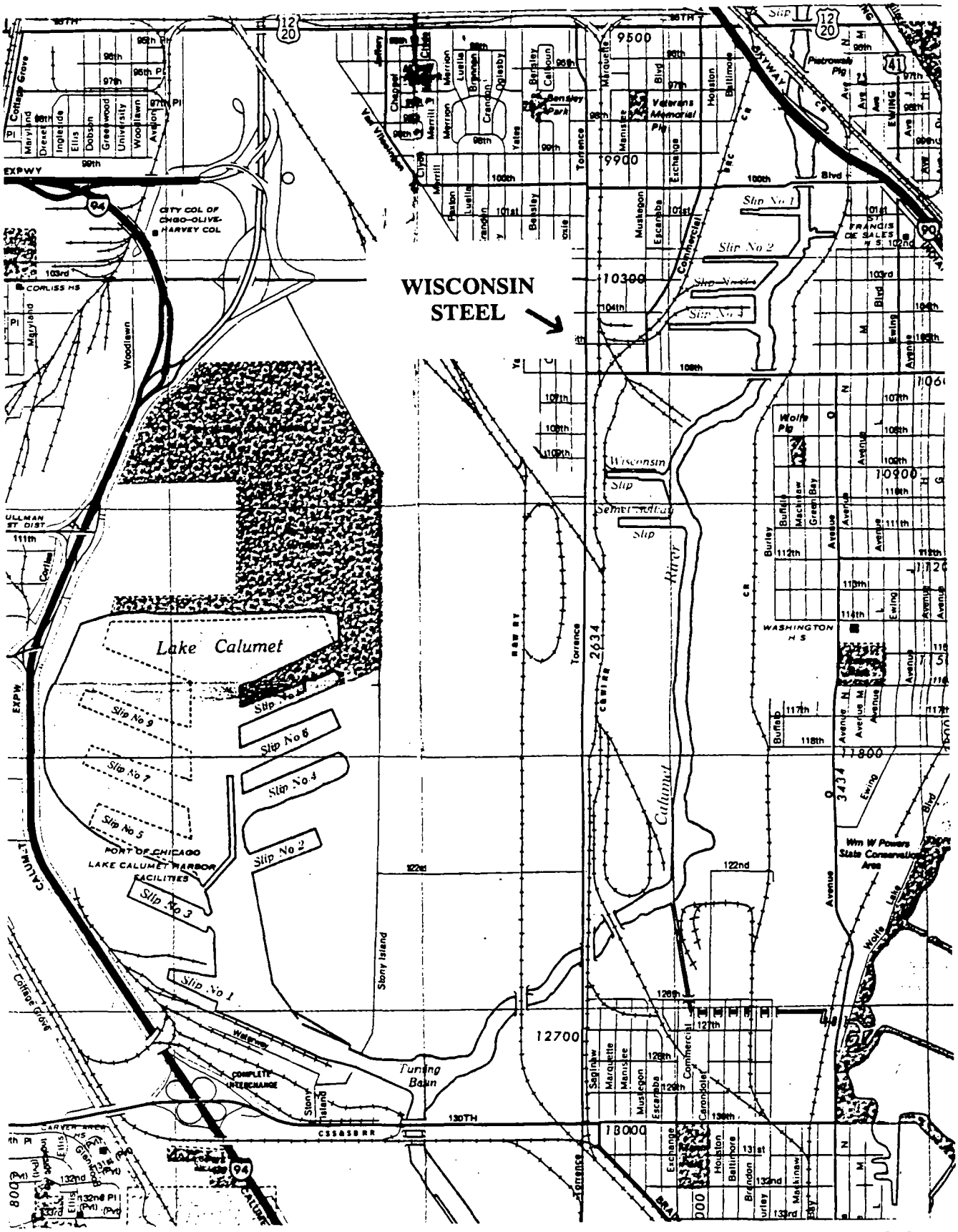
6. ATSDR. Toxicological Profile for Lead Draft. October 1991.

7. ATSDR. Toxicological Profile for Polycyclic Aromatic Hydrocarbons (PAHs) Draft. October 1993.

8. ATSDR. Toxicological Profile for Selected PCBs Draft. October 1991.

9. USACE. August 1993.

ATTACHMENT 1



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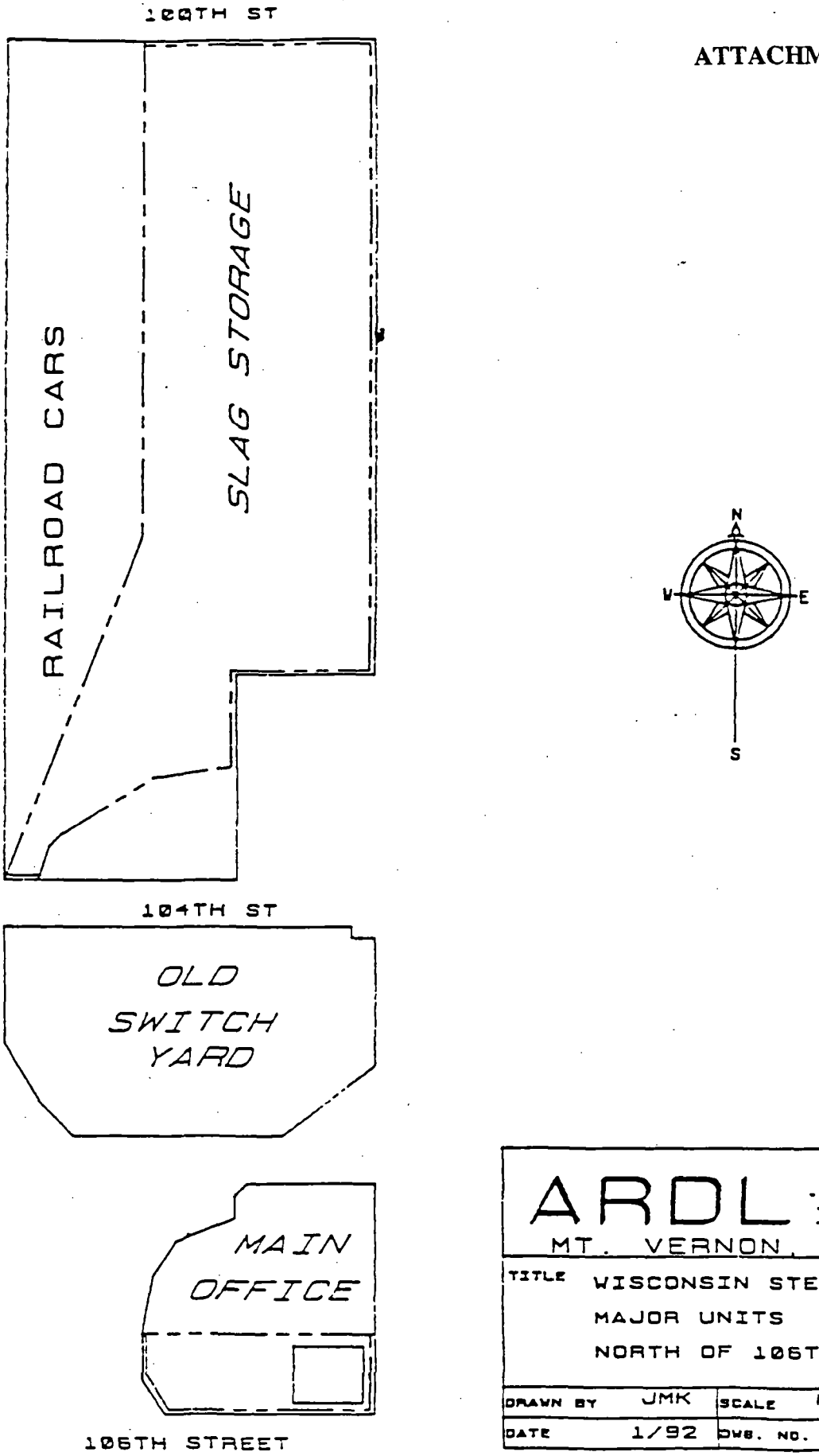

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MT. VERNON, IL	
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DATE 1/92	DWG. NO. 1-3D

ATTACHMENT 3

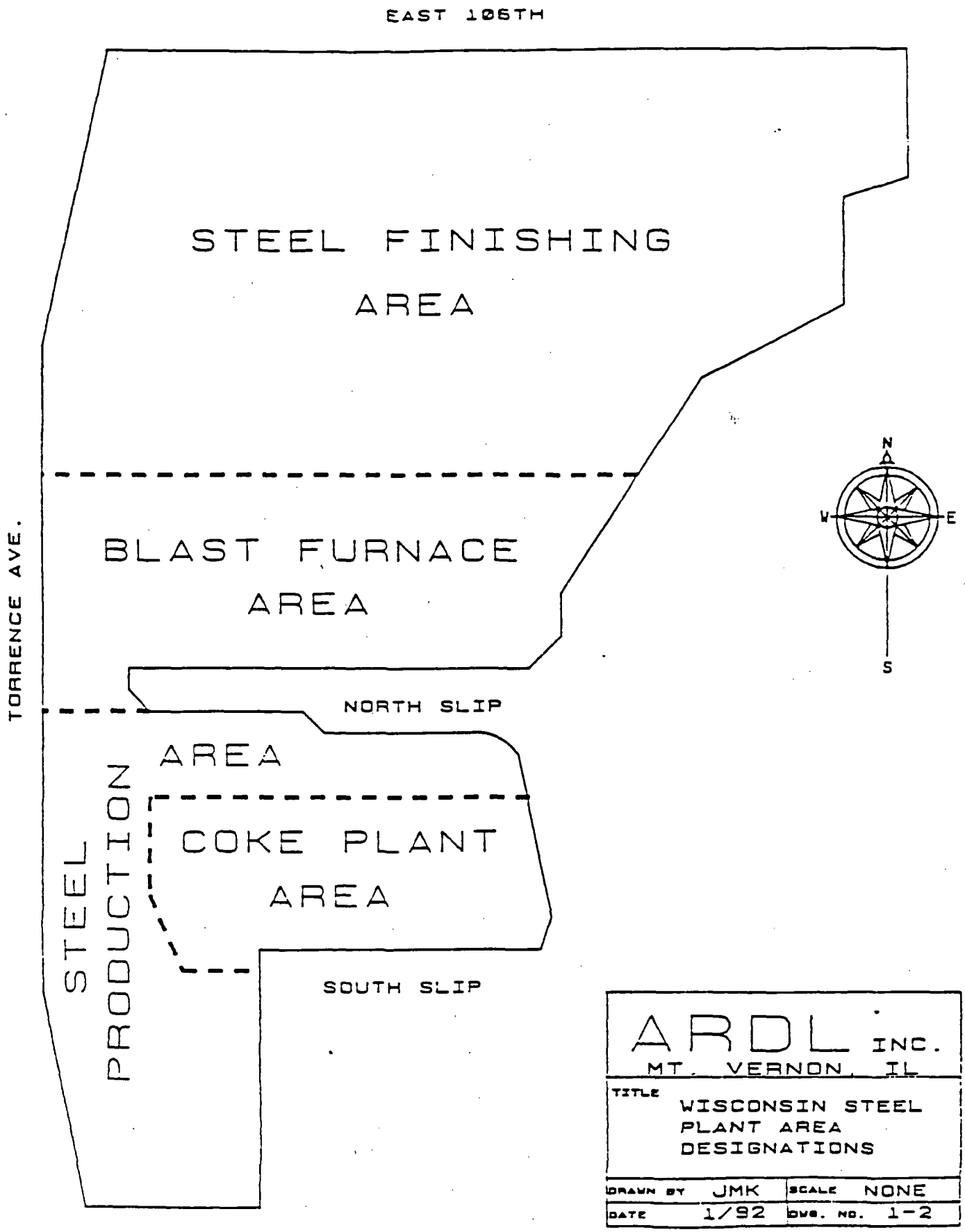

TABLE ONE

Comparison Values Considered For Selecting Contaminants of Concern

CONTAMINANT	SURFACE SOILS AND SEDIMENTS (ug/kg)	WATER (ug/L)
Arsenic	10,000 EMEG	0.02 CREG
Barium	4,000,000 RMEG	700 RMEG
Cadmium	30,000 RMEG	5 RMEG
Chromium	300,000 RMEG	50 RMEG *
Copper	NA	1,300 MCL**
Iron	NA	NA
Lead	B2 carcinogen	15 MCL**
Manganese	300,000 RMEG	50 RMEG
Nickel	1,000,000 RMEG	200 RMEG
Zinc	20,000,000 RMEG	3,000 RMEG
TRPH	NA	NA
Total Cyanide	1,000,000 RMEG	200 RMEG
Phenol	30,000,000 RMEG	6,000 RMEG
Oil & Grease	NA	NA
Acetone	5,000,000 RMEG	1,000 RMEG
Benzene	20,000 CREG	1 CREG
Carbon Disulfide	5,000,000 RMEG	1,000 RMEG
Toluene	1,000,000 EMEG	2,000 RMEG
1,1,1 Trichloroethane	NA	200 MCL
Xylenes	10,000,000 EMEG	2,000 EMEG
Arochlors (PCBs)	90 CREG	0.005 CREG
Chlordanes	500 CREG	0.03 CREG
Dieldrin	40 CREG	0.002 CREG
Benzo(a)pyrene	100 CREG	0.005 CREG
Benz(a)anthracene	B2 carcinogen	B2 carcinogen
Benzo(b)fluoranthene	B2 carcinogen	B2 carcinogen
Chrysene	B2 carcinogen	B2 carcinogen
Dibenzo(a,h)anthracene	B2 carcinogen	B2 carcinogen

ug/kg = micrograms of contaminant per kilogram of soil
ug/L = micrograms of contaminant per liter of water
NA = None Available
* = Chromium (VI)
** = USEPA action level for drinking water supplies

ATTACHMENT 5

Comparison Values Used In Selecting Contaminants of Concern

Environmental Media Evaluation Guides are developed for chemicals based on their toxicity, frequency of occurrence at National Priority List (NPL) sites, and potential for human exposure. They are derived to protect the most sensitive populations and are not cut-off levels, but rather comparison values. They do not consider carcinogenic effects, chemical interactions, multiple route exposure, or other media-specific routes of exposure, and are very conservative concentration values designed to protect sensitive members of the population.

Reference Dose Media Evaluation Guides are another type of comparison value derived to protect the most sensitive populations. They do not consider carcinogenic effects, chemical interactions, multiple route exposure, or other media-specific routes of exposure, and are very conservative concentration values designed to protect sensitive members of the population.

Cancer Risk Evaluation Guides are estimated contaminant concentrations based on a one excess cancer in a million persons exposed to a chemical over a lifetime. These are also very conservative values designed to protect sensitive members of the population.

Maximum Contaminant Levels have been established by USEPA for public water supplies to reduce the chances of adverse health effects from contaminated drinking water. These standards are well below levels for which health effects have been observed and take into account the financial feasibility of achieving specific contaminant levels. These are enforceable limits that public water supplies must meet.

ATTACHMENT 6

TABLE TWO

Maximum On-Site Contaminant Levels For Each Environmental Medium
Main Office Area

CONTAMINANT	SURFACE SOILS (ug/kg)	GROUNDWATER (ug/L)
Chromium		63
Iron	135,000,000	16,400
Lead		21
Manganese	10,400,000	1,300
TRPH	659,000	2,200
Oil & Grease	940,000	4,000

ug/kg = micrograms of contaminant per kilogram of soil
ug/L = micrograms of contaminant per liter of water

TABLE THREE

Maximum On-Site Contaminant Levels For Each Environmental Medium
Slag Storage Area

CONTAMINANT	SURFACE SOILS (ug/kg)	GROUNDWATER (ug/L)	SEDIMENTS (ug/kg)
Cadmium		7.8	
Chromium		410	
Iron		461,000	
Lead		72	
Manganese	8,050,000	10,000	
Nickel		750	
TRPH	1,150,000	2,000	
Oil & Grease	1,150,000	4,800	
Arochlors			180,000
Benzo(a)pyrene			390,000
Benzo(a)anthracene			360,000
Benzo(b)fluoranthene			320,000
Chrysene			340,000
Dibenzo(a,h)anthracene			250,000

ug/kg = micrograms of contaminant per kilogram of soil
ug/L = micrograms of contaminant per liter of water

ATTACHMENT 7

TABLE FOUR

Maximum On-Site Contaminant Levels For Each Environmental Medium Steel Finishing Area

CONTAMINANT	SURFACE SOILS (ug/kg)	SURFACE WATER (ug/L)	GROUND-WATER (ug/L)	SEDIMENTS (ug/kg)
Arsenic		110		
Cadmium		23	150	
Chromium			39,100	
Iron	195,000,000	1,600	72,900	166,000,000
Lead	1,000,000		73	688,000
Manganese	12,300,000	290	3,400	
Nickel			400	
TRPH	2,560,000	6,100	2,900	180,000,000
Total Cyanide		3,800	220	
Phenol		15,200		
Oil & Grease	2,330,000	10,200	12,200	212,000
1,1,1 Trichloroethane		1,400		
Arochlors	3,100			57,000
Chlordanes	360,000			
Benzo(a)pyrene	29,000			110
Benzo(a)anthracene	40,000			4,800
Benzo(b)fluoranthene	32,000			3,000
Chrysene	39,000			160
Dibenzo(a,h)anthracene	12,000			

ug/kg = micrograms of contaminant per kilogram of soil
ug/L = micrograms of contaminant per liter of water

ATTACHMENT 8

TABLE FIVE

Maximum On-Site Contaminant Levels For Each Environmental Medium Steel Production Area

CONTAMINANT	SURFACE SOILS (ug/kg)	SURFACE WATER (ug/L)	GROUND-WATER (ug/L)	SEDIMENTS (ug/kg)
Arsenic			27,500	
Chromium		72	28,100	
Copper				106,000,000
Iron	131,000,000	2,200	4,540,000	227,000,000
Lead	228,000	39	49	2,470,000
Manganese	8,230,000	70	485,000	5,270,000
TRPH	2,860,000		95,100,000	414,000,000
Oil & Grease	1,740	1,700	122,000,000	101,000,000
Benzene			14,000	
Xylenes			680,000	
Arochlors	3,600	13		4,200,000
Benzo(a)pyrene	8,700		82	7,500
Benzo(a)anthracene			2.2	67,000
Benzo(b)fluoranthene	10,000		81	23,000
Chrysene	20,000		870	24,000
Dibenzo(a,h)anthracene				14,000

ug/kg = micrograms of contaminant per kilogram of soil
ug/L = micrograms of contaminant per liter of water

ATTACHMENT 9

TABLE SIX

Maximum On-Site Contaminant Levels For Each Environmental Medium Blast Furnace Area (including ore storage area)

CONTAMINANT	SURFACE SOILS (ug/kg)	GROUNDWATER (ug/L)	SEDIMENTS (ug/kg)
Arsenic		51	211,000
Barium		3,000	
Cadmium		8.3	
Chromium		3,200	
Copper			1,270,000
Iron	152,000,000	1,300,000	258,000,000
Lead	377,000	1,200	4,410,000
Manganese	7,530,000	16,200	
Nickel		820	
Zinc		12,300	
TRPH	4,250,000	3,200	60,800,000
Oil & Grease	5,340,000	9,600	75,500,000
Arochlors	12,000		
Benzo(a)pyrene	3,100		
Benzo(a)anthracene	5,000		42,000
Benzo(b)fluoranthene	2,700		
Chrysene	5,400		19,000

ug/kg = micrograms of contaminant per kilogram of soil
ug/L = micrograms of contaminant per liter of water

ATTACHMENT 10

TABLE SEVEN

Maximum On-Site Contaminant Levels For Each Environmental Medium
Coke Plant Area (including coal storage area)

CONTAMINANT	SURFACE SOILS (ug/kg)	SURFACE WATER (ug/L)	GROUND-WATER (ug/L)	SEDIMENTS (ug/kg)
Chromium			170	
Iron	158,000,000	8,200,000	57,000	
Lead	1,060,000	25,000	29	
Manganese	9,200,000	3,900	2,800	
TRPH	1,390,000	2,100	4,000	71,200
Total Cyanide		650	360	
Phenol			6,700	
Oil & Grease	880,000	26,500	9,600	75,300
Benzene			50,000	170,000
Toluene			12,000	
Xylenes			8,400	
Arochlors	630			
Benzo(a)pyrene	1,800		2.8	6,500,000
Benzo(a)anthracene	970		3.5	7,900,000
Benzo(b)fluoranthene	1,400		2.5	4,300,000
Chrysene	710			7,200,000
Dibenzo(a,h)anthracene	2,400		0.74	

ug/kg = micrograms of contaminant per kilogram of soil
ug/L = micrograms of contaminant per liter of water

CERTIFICATION

This Health Consultation was prepared by the Illinois Department of Public Health under a cooperative agreement with the Agency for Toxic Substances and Disease Registry (ATSDR). It is in accordance with approved methodology and procedures existing at the time the Health Consultation was initiated.

Technical Project Officer, SPS, SSAB, DHAC

The Division of Health Assessment and Consultation, ATSDR, has reviewed this Health Consultation and concurs with its findings.

Chief, SSAB, DHAC, ATSDR